

STAINLESS STEEL FLUID HEATER



READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

FLUID HEATER DATA

Models	651747-2-M
Wetted Parts Material	Stainless Steel
Volts AC	220
Amperes	8.3
Watts	2000
Accuracy	±1.9° C (3-1/2° F)
Temperature Rise Above Ambient . . .	38° C (100° F)
Recovery Rate per Hour	56.8 liters (15 gallons)
Maximum Working Pressure	35 MPa (5000 p.s.i.)
Maximum Temperature Range	16 - 121° C (60 - 250° F)
Surface Temperature Code	T3 (200° C / 392° F)
Fluid Passage Diameter	9.4 mm (0.370")
Fluid Passage Length	232.9 cm (91.7")
Fluid Passage Volume	0.162 lit. (9.86 in. ³)
Inlet / Outlet Port Size (female)	1/2 - 14 N.P.T.F. - 1
Weight	8.2 kg (18 lbs)
Environment Approval	Group II 2 G Ex dII B T3
CENELEC Standard	EN 60079-0 & EN 670079-1
Notified Body Certification	TRL04ATEX11052

GENERAL DESCRIPTION

The Aro stainless steel fluid heater models are wired for 220 volt AC applications. The heating element is a 2000 watt cartridge type and is thermostatically controlled. The wiring, heating element and thermostat are protected by a preset heat limiter.

The thermostat is adjustable up to approximately 121° C (250° F). The heater is off when the thermostat knob is turned counterclockwise as far as possible. The heater will not switch on until the knob is rotated to at least ambient room temperature.

Fluid heaters have been tested in water soluble oil. Some of this fluid may be left within the heater, therefore flush out this fluid with a solvent compatible with the material to be pumped.

- This unit utilizes an explosion-proof electrical section and internally spiraling material section. The material enters the base under line pressure from the pump and is heated and delivered thru to the material outlet at the top.
- Two or more paint heaters may be coupled together by plumbing the material outlet of the first heater to the material inlet of the next, etc. However, the distance of piping run between the units should be limited to no more than three feet (see figure 4, page 4).

TYPICAL INSTALLATION

The heater inlet and outlet should be plumbed (up flow) as shown (see figure 4, page 4), to minimize chances of trapped air inside the heater. If the inlet and outlet are reversed (down flow), the temperature rise will be different.

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DIMENSIONAL DATA

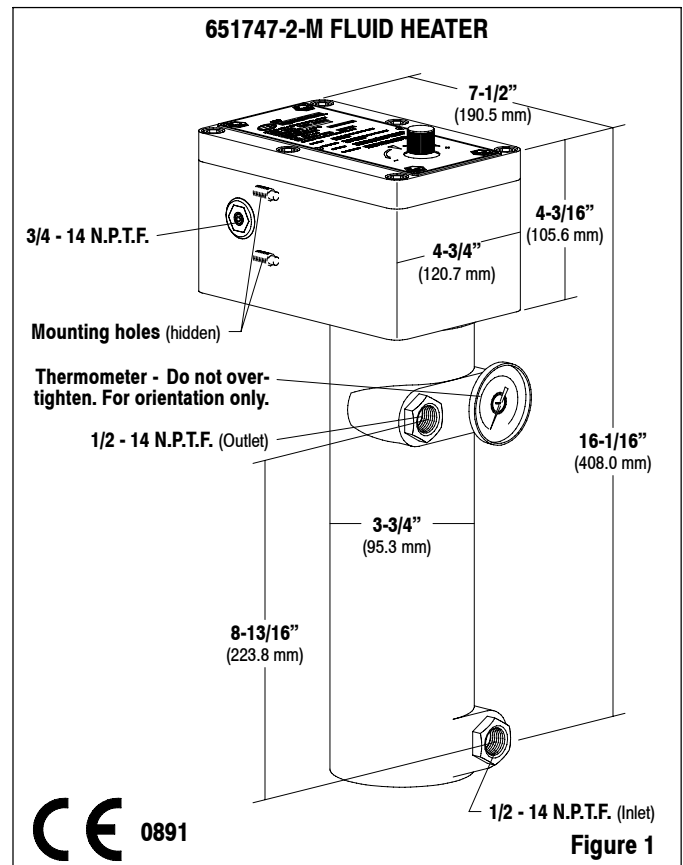


Figure 1

OPERATING PRECAUTIONS

- Heed all warnings.
 - ⚠ WARNING** Do not exceed 35 MPa (5000 p.s.i.) maximum.
 - ⚠ WARNING** HIGH PRESSURE DEVICE. Improper usage of this equipment could result in serious injury. The possibility of injection into the flesh is a potential hazard. Never allow any part of the human body to come in front of, or in direct contact with, the material outlet. An injection injury can be serious. If injection should occur, contact a qualified physician for immediate treatment.
 - ⚠ CAUTION** Electrical supply power to the heater must be off during flushing operation.
 - ⚠ CAUTION** Use only genuine Aro replacement parts to assure compatible pressure rating and longest service life.
 - ⚠ CAUTION** Do not remove cover when energized.

ARO

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POWER SUPPLY AND INSTALLATION

Do not use neutral as earth ground. A single phase power / earth ground is required. If this is not available, use a transformer to obtain single phase power.

Provisions should be made for a quick disconnect or shut-off of all electrical power to this unit.

All wiring must comply with all local and / or national electrical codes.

- Electrical codes that apply must be strictly adhered to. Failure to do so may lead to shock hazard or serious injury.
- Some local electrical codes may require the installation of rigid conduit.
- The installer of this system assumes full responsibility for compliance with these codes.
- Aro is not responsible for accidents resulting from improper installation of components or hardware.
- No electrical power should be in the system at the time the cover is removed.

AIR AND LUBE REQUIREMENTS

Commonly used solvents and their lowest boiling points as pertains to the Aro free flow system:

<u>Hydrocarbons (Petroleum Naphthas)</u>	Boiling Point ° F (° C) ☆
VM & P	244 (118)
Mineral Spirits	314 (157)
Odorless Mineral Spirits	353 (178)
<u>Aromatics (Terpenes)</u>	
Benzene	172 (78)
Toluene	230 (110)
Xylene	281 (138)
Gum Turpentine	311 (155)
Dipentene	347 (175)
<u>Alcohols</u>	
Methanol	147 (64)
Isobutyl Alcohol	223 (106)
Nybutyl Alcohol	241 (116)
<u>Keytones</u>	
MEK	174 (79)
Acetone	122 (50)
Diacetone	284 (140)

☆ International Critical Tables (ref.)

OPERATING INSTRUCTIONS

START-UP PROCEDURE

1. Fill the system with fluid.
2. Circulate the fluid thru the system.

⚠ CAUTION Power should never be on when there is only solvent in the system. Solvents can expand if there is no circulation, causing excessive and hazardous pressure in the system.

3. Turn the power on.
4. Set the thermostat just below the boiling point of the lowest boiling solvent in the coating material (see table above).
5. Allow fluid to circulate thru the heater for 5 - 10 minutes.
6. Readjust the thermostat as necessary.
 - To adjust the temperature, turn the knob:
 - a. Clockwise - higher temperature
 - b. Counterclockwise - lower temperature

SHUTTING THE SYSTEM OFF

1. Allow the fluid to circulate for 5 - 10 minutes after shutting the heater off, to cool the system.
2. Always leave the solvent or fluid in the heater.

MAINTENANCE

NOTE: The (26) fluid track is a cast assembly and cannot be disassembled for cleaning. **Do not allow material to solidify inside the heater.** Flush the paint heater with the proper solvent immediately following each use.

⚠ CAUTION Shut the electrical supply off and relieve all pressure from the system before servicing any part of the fluid heater system.

CLEANING

1. When cleaning the fluid heater, use only solvents compatible with the material being pumped.
2. The fluid heater should be flushed with solvent when changing medias, or when it is not being used for a period of time.

NOTE: For other maintenance problems, see "Trouble Shooting", page 4.

DISASSEMBLY

NOTE: The following procedure is for the repair of the (27) heater cartridge assembly or (24) thermostat.

1. Relieve all fluid pressure in the system.
2. Rotate the (19) adjusting knob counterclockwise to the "off" position.
3. Disconnect the power supply to the fluid heater assembly.
4. Disconnect the fluid lines.
5. Remove the six (2) cap screws.
6. Remove the (16) cover.
7. Remove the two (10) machine screws and (11) lockwashers from the (15) housing, which retain the thermostat assembly.
8. Remove (as one unit) the (8) terminal block, (24) thermostat and (9) mounting plate by carefully lifting it out and removing the power lead wires (1 and 3) from the first two positions on the (8) terminal block (refer to figure 3).
9. Remove the (27) heater cartridge assembly leads from the (8) terminal block third and fourth positions.
10. Carefully finish removing the assembly by pulling the thermostat capillary tube out of the (26) fluid track body.

NOTE: Special care must be taken not to sharply bend or kink the capillary tube which will ruin the thermostat. Do not use pliers or other tools which may also damage the tube.

HEATER CARTRIDGE REMOVAL

1. Pull the (27) heater cartridge assembly from the (26) fluid track.

NOTE: If the (27) heater cartridge assembly does not easily come out, do the following:

 - a. Remove the (28) pipe plug from the bottom of the (26) fluid track.
 - b. Carefully drive the (27) heater cartridge assembly out thru the top of the heater (toward the cover).

REASSEMBLY

1. Reassembly is done in the reverse order.

NOTE: When reinstalling the (16) cover, be certain the (19) adjusting knob is turned out.
2. Rotate the adjusting knob clockwise out as far as it will go and turn it back in carefully to align the slots with the thermostat.

PARTS LIST / 651747-2-M

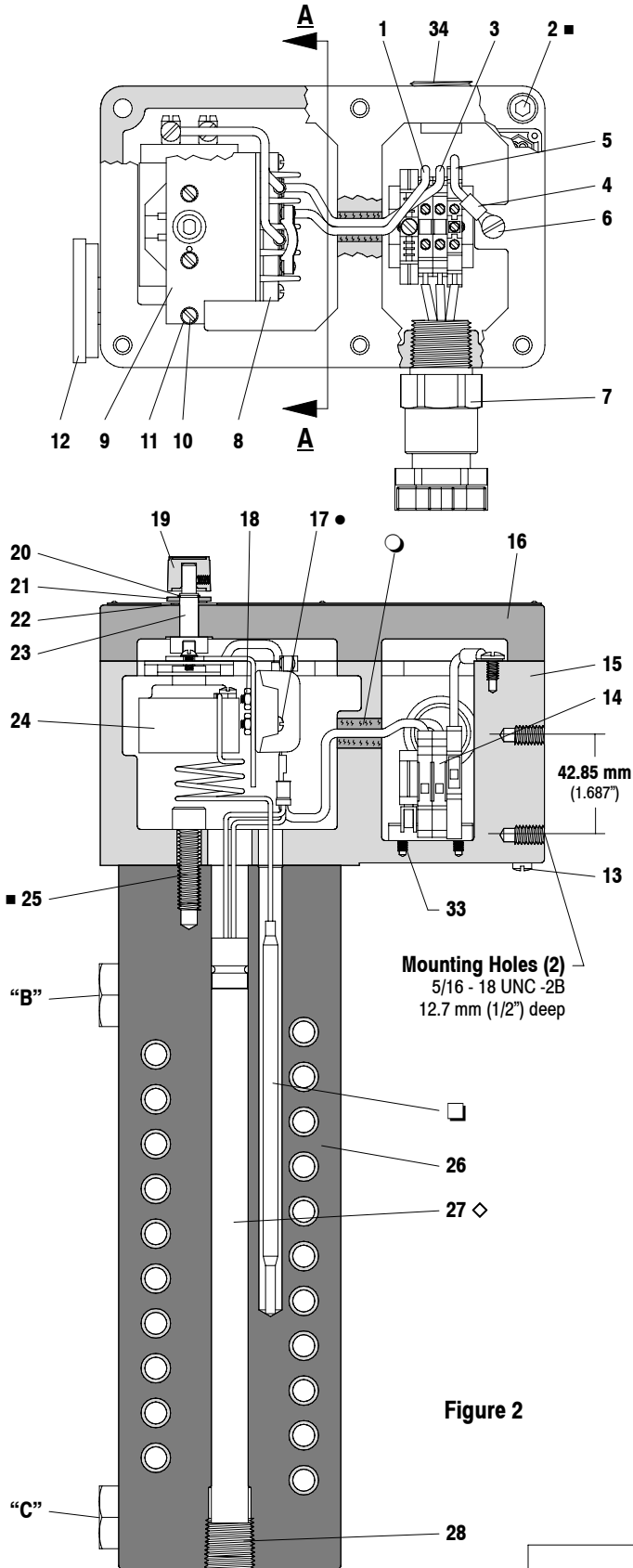


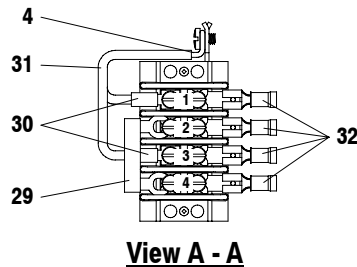
Figure 2

“B” Outlet (1/2 - 14 N.P.T.F. - 1)
 “C” Inlet (1/2 - 14 N.P.T.F. - 1)

- (25) Torque to 10 - 12 ft lbs (13.6 - 16.3 Nm).
- (17) Apply Loctite 242 to threads.
- Apply Crouse Hinds Sealing Compound or Appleton CO-4 Sealing Cement and allow to set before moving wires.
- Apply Dow Corning 340 Silicone Heat Sink Compound.
- ◇ Apply Wat Lube

Item	Description (size)	Qty	Part No.
* 1	14 Gauge Wire (12" long, black)	(1)	78140-XXX-X
2	Cap Screw (M8 - 1.25 x 30 mm)	(6)	93475-M
* 3	14 Gauge Wire (12" long, red)	(1)	78141-XXX-X
4	Ring Terminal	(3)	78143
* 5	14 Gauge Wire (7" long, green)	(1)	78142-XXX-X
6	Machine Screw (#10 - 24 x 1/4")	(1)	Y76-103-C
7	Cable Gland (3/4 - 14 P.T.F.)	(1)	93473-M
8	Terminal Block	(1)	92932
9	Mounting Plate	(1)	93583-1
10	Machine Screw (#6 - 32 x 1/4")	(4)	Y8-463-C
11	Lockwasher (#6)	(4)	Y1-6
12	Thermometer (0° - 250° F / -10° - 120° C)	(1)	91696
13	Ground Screw (M5 - 0.8 x 10 mm)	(1)	93474-M
14	Rail	(1)	93472-M
15	Housing	(1)	92928-M
16	Cover	(1)	93466-M
17	Machine Screw (#6 - 32 x 5/8")	(2)	Y8-468-C
18	Nut (#6 - 32)	(2)	Y22-6-C
19	Adjusting Knob	(1)	93586-1
20	Retaining Ring	(1)	93471-M
21	Washer (1/4")	(1)	Y13-4-C
22	Spring Washer	(1)	93470-M
23	Spindle	(1)	93467-M
24	Thermostat (16° - 121° C / 60° - 250° F) (20 amp. / 480 volt AC)	(1)	92972
25	Cap Screw (3/8" - 16 x 1-1/4")	(3)	Y99-63
26	Fluid Track	(1)	92974
27	Heater Cartridge Assembly (+10% / -5%) (230 / 240 volt AC, 27.36 Ohms)	(1)	66751-2
28	Pipe Plug (1/2 - 14 N.P.T.)	(1)	Y17-53
29	Heater Limiter	(1)	92935
30	Terminal	(2)	78035
* 31	14 Gauge Wire (6" long, black)	(2)	78140-XXX-X
32	Terminal	(4)	78034-1
33	Machine Screw (M4 x 5 mm)	(2)	93472-M6
34	Blanking Plug (3/4 - 14 N.P.T.)	(1)	93476-M

* Available in bulk rolls only.



View A - A

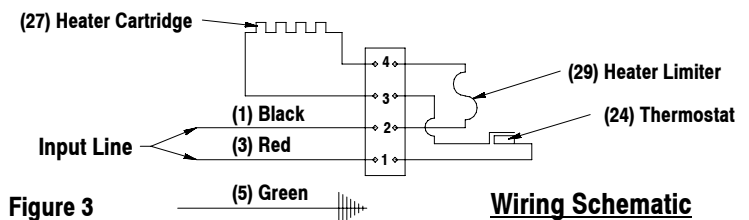


Figure 3

Wiring Schematic

TROUBLE SHOOTING

Fluid heater will not produce heat.

- No current to the heater unit.
Check the main power switch.
Check the power supply fuse, etc.
- Damaged thermostat.
Replace the thermostat.
- The heat limiter is burned out.
Replace the heat limiter.
- The heat element is burned out.
Replace the heater cartridge element.

Correct the wiring.

- Material build-up inside the heater.
Clean the fluid heater and material lines.

Inadequate material flow.

- Material build-up inside the heater.
Clean the fluid heater and material lines.

The temperature of the material is too low.

- The voltage to the heater is too low.
Correct the wiring.
- The thermostat is damaged.
Replace the thermostat.
- The thermostat setting is wrong.
Adjust the thermostat.
- Material build-up inside the heater.
Clean the fluid heater and material lines.
- The material flow is too fast.
Reduce the material flow.

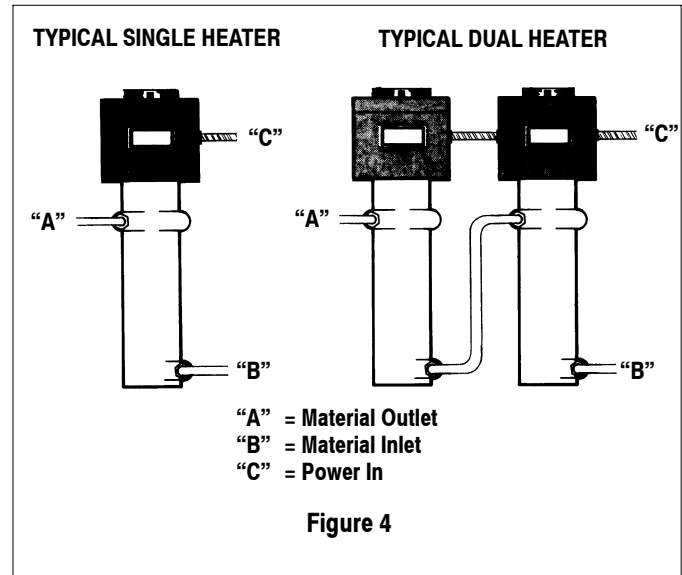
The temperature of the material is too high.

- The thermostat is damaged.
Replace the thermostat.
- Wrong setting on the thermostat.
Reset the thermostat.

The heater takes too long to heat the material.

- The voltage is too low.

TYPICAL INSTALLATION



ACCESSORIES

